SOUNDWARE
MUSIC SOFTWARE

MIDI/4

FOUR CHANNEL RECORDING SOFTWARE

USERS MANUAL

PASSPORT DESIGNS, INC

"The Music Software Source"

FOR COMMODORE 64

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INTRODUCTION

Passport Designs' MIDI Sequencer Software is the vanguard of an exciting new phase in the evolution of synthesizers; now the sound and performance features of commercial synthesizers and electronic keyboards can be combined with the speed and power of a microcomputer.

This program is easy to learn, fast to use, and what it does sounds simple; it will memorize every aspect of a musical performance, store it, and play it back. It can also be used in more sophisticated and subtle ways.

- Track Mixing. As the name implies, MIDI/4 is, in simplest form, a 4-track polyphonic sequencer. However, the MIX feature allows you to combine sequences and continue overdubbing new tracks. As a result, finished sequencer files can contain literally dozens of sequencer tracks.

- Pitch benders, modulation wheels, breath controllers, foot pedals, keyboard velocity, after-touch, presets; all control changes are stored and played back exactly as you used them.

- Powerful. Up to sixteen keyboards and a drum machine can be chained together in one MIDI system. Separate tracks can control separate keyboards, or the same track can control several keyboards. And of course, the sequencer doesn't hamper your ability to play the keyboard "live".

- MIDI Sequencer tracks are enormous; your sequences can be over six thousand notes long. Easy-to-use looping means you can lay down rhythm tracks and have them repeat in perfect sync while you solo over the top.

HARDWARE REQUIREMENTS

This version of MIDI Sequencer Software requires the following hardware in order to operate:

- One Apple II-type computer with at least 48K RAM, video monitor, and one disk drive with disk controller card.
- One Passport Designs or Yamaha MIDI interface card with two DIN (5-pin) connecting cables.
- One MIDI-equipped synthesizer.
- Amplifier, headphones, or other audio monitoring system.
- OPTIONAL - Programmable drum machine.
- OPTIONAL - MIDI Drum Sync Cable Kit.

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APPLE //e USERS

Make sure your CAPS LOCK key is down!

DATA STORAGE DISKS

Before using MIDI/4, you will need to prepare at least one blank disk to store your sequencer data files on. A blank disk must be "initialized" (or "formatted") before it can be used for data storage. Instructions for doing so can be found on pg.64 of the Apple //e Owner's Manual or pg.24 of the Apple II+ DOS Manual.

Once the MIDI/4 program is loaded and running, you can't exit to initialize a data disk without losing your current project.

INSTALLATION

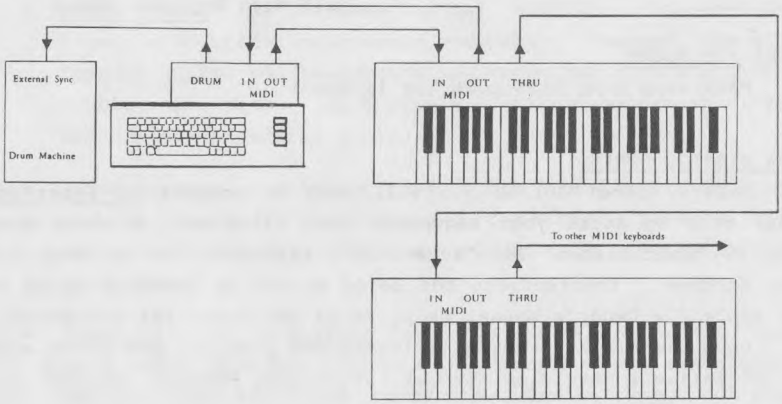
The first step is to install the MIDI interface card in your computer. With the power off (pulling the plug is even better), open the top of your computer and locate slot #2. In Apple //e's this is the second slot from the left end. In Apple II's or II+'s this is the third slot from the left end.

Now insert the MIDI interface card into slot #2. It can only fit one way. After the card is in the slot, lead the three short cables (labeled DRUM, IN, and OUT) out through the back of your computer, and close the top.

The next step is to connect the cables between your synthesizer and the interface card:

- Connect the Computer MIDI OUT to Synthesizer MIDI IN.
- Connect Synthesizer MIDI OUT to Computer MIDI IN.

If you have multiple keyboards in your MIDI system, only one synthesizer is connected directly to the computer. Additional keyboards tie into the system via cables from MIDI THRU on one instrument to MIDI IN on the next keyboard in the chain.



Initially, set all synthesizers to MIDI Channel Ø1. (For more details see your synthesizer manual.) In multiple-keyboard setups, remember that the synthesizer connected directly to the computer is your recording keyboard. All the other instruments are playback-only.

CONNECTING METRONOME AMPLIFIER (OPTIONAL)

This program can generate an audible metronome pulse during recording, through the speaker in the Apple. If you'd like a louder metronome the signal also comes out the CASSETTE OUT jack on the Apple, and may be connected to an external amplifier.

CONNECTING DRUM MACHINES (OPTIONAL)

Using the Passport Designs Drum Sync Cable kit (pg.5), most brands of drum machine can be integrated into your MIDI system. With Drum Sync, your MIDI system generates the CLOCK & START/STOP signals for the drum machine. (Your drum machine must be capable of accepting external clock signals for this to work.)

The Drum Sync Cable kit consists of two parts: 1) a male-to-male DIN 5-pin cable, and 2) a female DIN "Y" cable terminating with 2 quarter-inch phone plugs.

MIDI-equipped Drum Machines

Drum machines equipped with MIDI interface are connected via the MIDI IN and THRU jacks, just like other synthesizers (pg.6).

Roland or Korg Drum Machines

If you use a Roland, Korg, or other non-MIDI drum machine equipped with a 5-pin DIN socket for external sync:

1) Connect the male-to-male DIN cable from the DRUM output of the MIDI interface to the external sync input on your drum machine.
2) Set the SYNC INPUT/OUTPUT switch on the drum machine to INPUT.

Linn, Oberheim, Drumulator, and others

If you're using a Linn, Oberheim, Drumulator, or other drum machine without a DIN sync connector, you must use both cables in the Drum Sync Cable set.

1) Connect the male-to-male DIN cable to the DRUM output of the MIDI interface.
2) Attach the female DIN "Y" cord to the male DIN cable.
3) Insert the straight phone plug into the CLOCK input of the drum machine, and the right angle phone plug into the START/STOP (or footswitch) input of the drum machine.

GETTING STARTED

To begin using the MIDI/4 Sequencer program:

1 Turn on your video monitor, disk drive, and computer.

2 When the BASIC prompt appears, place the MIDI/4 program disk in your disk drive and type the following command: LOAD "*",8 and press (RETURN)

3 When the program has finished loading, type RUN and press (RETURN) If you wish to skip the "boot" screen press (SPACE BAR) In a few seconds you're looking at the FORMAT screen:

```
                    MIDI/4
      4-CHANNEL SEQUENCING SOFTWARE FOR MIDI
         COPYRIGHT 1984 PASSPORT DESIGNS

 TR   MODE   CH   PRE      INSTRUMENT
 1    OFF    01   001      ************
 2    OFF    01   001      ************
 3    OFF    01   001      ************
 4    OFF    01   001      ************

TEMPO = 060      TRANS = +00      CLICK = 0
DRUMS = OFF      LOOP  = OFF      TOUCH = OFF

                  FORMAT SECTION
        <-- LAST F1          F3 NEXT -->
                        F7
                    NEXT TRACK
                (PRESS SPACE TO EXIT)
```

4 Remove the program disk from your disk drive, and insert a formatted data disk.

5 Turn on all the instruments connected to your MIDI interface.

STEP-BY-STEP MIDI/4

Beginning on pg.13, we'll conduct a thorough exploration of the FORMAT screen. However, for those of you who can't wait here is a quick "step-by-step" guide to MIDI/4.

Single Track Recording

PROMPT	RESPONSE	EXPLANATION
Format screen.	Press Ⓡ	Set Track 1 MODE to record.
	Press (SPACE)	To exit Format screen.
RECORDER IS OFF DISK/EDIT/FORMAT PRESS <SPACE> TO PLAY OR RECORD		You are now ready to begin recording.
	Press (SPACE)	To begin recording.
RECORDER IS ON	Play keyboard.	Whatever you play on the keyboard is recorded exactly as you play it.
RECORDER IS ON	Press (SPACE)	To stop recording and return to Format screen.
Format screen.	Press Ⓟ	Set Track 1 MODE to playback.
	Press (SPACE)	To exit Format screen.
RECORDER IS OFF DISK/EDIT/FORMAT PRESS <SPACE> TO PLAY OR RECORD		You are now ready to begin playback.
	Press (SPACE)	To playback recorded sequence.

NOTE: You can play the keyboard "live" along with the sequence.

Overdub Recording

PROMPT	RESPONSE	EXPLANATION
Format screen.	Press Ⓡ Press (SPACE)	Set Track 1 MODE to record. To exit Format screen.
RECORDER IS OFF DISK/EDIT/FORMAT PRESS <SPACE> TO PLAY OR RECORD	Press (SPACE) Play music on keyboard.	To begin recording Track 1.
RECORDER IS ON	Press (SPACE)	To end recording and return to Format screen.
Format screen.	Press (F7) Press Ⓡ Press (SPACE)	To switch to Track 2. Set Track 2 MODE to record. Track 1 MODE is automatically switched to playback. To exit Format screen.
RECORDER IS OFF DISK/EDIT/FORMAT PRESS <SPACE> TO PLAY OR RECORD	Press (SPACE) Play music on keyboard.	To begin recording Track 2. Track 1 plays back in sync.
RECORDER IS ON	Press (SPACE)	To end recording on Track 2 and return to Format screen.
Format screen.	Press Ⓟ Press (SPACE)	Set Track 2 MODE to playback. To exit Format screen.
RECORDER IS OFF DISK/EDIT/FORMAT PRESS <SPACE> TO PLAY OR RECORD	Press (SPACE)	To playback both recorded sequencer tracks.

NOTE: If, after experimenting with OVERDUB recording, you wish to try SINGLE TRACK LOOP RECORDING (next page), you must first turn Track 2 OFF (see pg.14).

Single Track LOOP Recording

PROMPT	RESPONSE	EXPLANATION
Format screen.	Press (R)	Set Track 1 MODE to record.
	Press (F3) eight times	To move cursor onto LOOP.
LOOP=OFF	Press (RETURN)	To switch LOOP=ON.
	Press (SPACE)	To exit Format screen.
RECORDER IS OFF DISK/EDIT/FORMAT PRESS <SPACE> TO PLAY OR RECORD		You are now ready to begin recording.
	Press (SPACE)	To begin recording.
	Play keyboard.	Whatever you play on the keyboard is recorded exactly as you play it.
RECORDER IS ON	Press (SPACE)	To stop recording and return to Format screen.
Format screen.	Press (F3)	Move cursor to Track 1 MODE.
	Press (P)	Set Track 1 MODE to playback.
	Press (SPACE)	To exit Format screen.
RECORDER IS OFF DISK/EDIT/FORMAT PRESS <SPACE> TO PLAY OR RECORD		You are now ready to begin playback.
	Press (SPACE)	To playback recorded sequence.

NOTE: The music you have just recorded will continue to repeat until you press the SPACE BAR again.

Overdub with LOOP

PROMPT	RESPONSE	EXPLANATION
Format screen.	Press (R) Press (F3) eight times	Set Track 1 MODE to record. To move cursor onto LOOP.
LOOP=OFF	Press (RETURN) Press (SPACE)	To switch LOOP=ON. To exit Format screen.
RECORDER IS OFF DISK/FORMAT/MIX PRESS <SPACE> TO PLAY OR RECORD	Press (SPACE) Play music on keyboard.	To begin recording Track 1.
RECORDER IS ON	Press (SPACE)	To end recording and return to Format screen.
Format screen.	Press (F3) Press (F7) Press (R) Press (SPACE)	Move cursor to Track 1 MODE. To switch to Track 2. Set Track 2 MODE to record. Track 1 MODE is automatically switched to playback. To exit Format screen.
RECORDER IS OFF DISK/FORMAT/MIX PRESS <SPACE> TO PLAY OR RECORD	Press (SPACE) Play music on keyboard.	To begin recording Track 2. Track 1 plays back in sync. Track 1 is the master track. Track 2 cannot be longer than Track 1.
RECORDER IS ON	Press (SPACE)	To end recording on Track 2 and return to Format screen.
Format screen.	Press (P) Press (SPACE)	Set Track 2 MODE to playback. To exit Format screen.
RECORDER IS OFF DISK/FORMAT/MIX PRESS <SPACE> TO PLAY OR RECORD	Press (SPACE)	To playback both recorded sequencer tracks.

FORMAT SCREEN IN DEPTH

The information displayed on the Format screen tells you a great deal about how your system will behave, so we'll spend some time exploring it. But first, look at the bottom third of the screen:

```
          FORMAT SECTION
<-- LAST F1          F3 NEXT -->
                F7
            NEXT TRACK
      (PRESS SPACE TO EXIT)
```

This is your COMMAND area. When working with MIDI/4, you'll always see a prompt here telling you what you're doing, and a list of the currently-valid command keys.

Right now you're in the FORMAT part of the program, where you determine how your instruments and tracks are hooked together, and how the click track will behave during recording. If you look at the middle third of the screen, you'll find a flashing > cursor. When the cursor points to an item, the item is changeable. Your currently-valid command keys are:

(F3) (FUNCTION 3 key) This moves the cursor through MODE, CH, PRE, INSTRUMENT, then to the bottom of the screen and TEMPO, TRANS, CLICK, DRUMS, LOOP, and TOUCH.

(F1) (FUNCTION 1 key) This moves the cursor in the opposite direction.

(F7) (FUNCTION 7 key) Selects which of the four channels you're working with. TEMPO, TRANS, CLICK, DRUMS, LOOP and TOUCH are common to all tracks.

(SPACE) After you've changed everything you wish to change on this screen, press the (SPACE BAR) to move on.

Now that you know how to move about on the screen, direct your attention to the line:

TR	MODE	CH	PRE	INSTRUMENT

These are the headings for the five columns on the screen.

TR

TR stands for TRACK Number; as you can see there are four TRACKs, labeled 1, 2, 3, and 4. Specific information for each TRACK is listed on the same line as the TRACK number.

MODE

MODE stands for TRACK MODE. A TRACK can be in either RECORD, PLAYBACK, or OFF MODE. To select the MODE, move the cursor to this area and press Ⓡ for Record, Ⓟ for Playback, or Ⓞ for Off. Only one track can be in Record at a time.

CH

CH stands for MIDI Input/Output CHANNEL. This is only of concern if you have several MIDI-equipped instruments and you wish to direct separate sequencer tracks to separate synthesizers. If you have just one instrument in your system leave all CHANNELs set to 1.

If you've several instruments daisy-chained together in your MIDI system, use CHANNEL to select which instruments are connected to the track. Valid CHANNEL numbers are 1 through 16.

At the same time, to be able to hear the track played back, you must set the CHANNEL number of a synthesizer to match the CHANNEL number of the track. Consult the synthesizer owner's manual for instructions on changing its MIDI INPUT/OUTPUT (I/O) CHANNEL.

PRE

This is a remote control for the PRESET on your synthesizer. When the sequencer is set to playback, the synthesizer will be switched to this PRESET.

Valid PRESET numbers are 1 through 128. PRESET can be entered either by selecting a PRESET on the synthesizer's control panel, or typing in the number on the computer and using the FUNCTION keys to move on. If you've entered an invalid number you won't be allowed to proceed until you have corrected it.

There are four things to be aware of when changing PRESET:

First: Just because you can enter 128 here doesn't mean you have 128 presets available on your synthesizer. Make sure the PRESET Number matches a preset that exists.

Second: If two or more tracks are on the same CHANNEL, then the PRESET for the highest-numbered track has priority. One synth can't play two different presets at the same time.

Third: Remember, this is the starting PRESET for this track. If you punched in a preset change on your instrument while recording, that preset change is saved, too. The instrument will automatically make the preset change every time you play the track back -- even if you change the starting PRESET!

Fourth: Some instruments use unusual codes to indicate presets, such as a letter for the memory bank and a number for the preset's position within the bank. In these cases the PRESET number on screen will appear to be different from the preset number on the synthesizer, as the screen shows the MIDI Standard code for the PRESET, and not the synthesizer's internal code.

Don't worry. Everything will still work correctly.

INSTRUMENT

Every sequence you record and save can have a different Track/Channel configuration. In a multiple-synthesizer setup this can make remembering which track goes to what INSTRUMENT a little difficult, so we've provided this space to help you remember. Type in the name (12 letters max.) and (RETURN).

You can use this space to identify the instrument connected to this CHANNEL (i.e., YAMAHA DX7, KORG POLY800, etc.) or the the sound (i.e., VIOLIN, FLUTE, etc.). It's there for your reference. Please note, though, this is just a name. It does not affect the CHANNEL setting; you must correctly set that yourself.

To ERASE a name in this space, place the cursor at the end of the name and then use the (DELETE) key to backspace over it.

Below the specific track information, you'll find five items common to all tracks. They are:

TEMPO

This is the TEMPO for the metronome (click track) you'll hear during recording, and is entered in beats-per-minute. The valid range is from 32 to 159.

Type in a number and use the FUNCTION keys to move on. If the number is outside the legal range you won't be allowed to move on until you fix it.

TRANS

TRANS stands for TRANSPOSITION; after a sequence has been recorded you may TRANSPOSE it into another key. This makes it possible to record in a key that's comfortable to play in and play back in the key you want to hear the part in.

The valid range is up or down 12 half steps (one octave). To TRANSPOSE, type in either a ⊕ (for up) or a ⊖ (for down) followed by a number from 1 to 12. If you enter a number without a plus or minus, MIDI/4 will TRANSPOSE up.

CLICK

The metronome can be set to "count off" a measure before recording begins; enter the number of beats (0 through 9) here. If CLICK is set to 0, the metronome is OFF.

When using CLICK, recording actually starts a fraction of a beat before the RECORDING message appears. This allows you to record "pick-up" notes.

DRUMS

If you have a suitable drum synthesizer (see pg.6) you may synchronize the sequencer and your drum machine. If DRUMS is 24 (ON), starting and stopping the sequencer also starts and stops the drum machine. To switch DRUMS between 24 (ON) and OFF, move the cursor to this control and press (RETURN).

The reason we use the expression "24" instead of "ON" on the screen is to indicate the Drum Sync CLOCK rate, which is 24 pulses per quarter note. If you're using a drum machine with a 48 pulse/qtr. CLOCK (Korg, Linn) or 96 pulse/qtr. CLOCK (Oberheim), consult Drum Sync CLOCK Rate Change (pg.31).

LOOP

The sequencer can operate in two distinctly different modes. In LOOP OFF mode, the sequence will play back once, and stop. In LOOP ON mode, the sequence plays through to the end, then restarts from the beginning without a break, and continues to repeat until you manually shut it off (by pressing (SPACE)).

LOOP is switched ON or OFF by moving the cursor to this area and pressing (RETURN). You must turn the LOOP ON before you record tracks which are to be LOOPed; you cannot lay down a track and then decide to make it a LOOP.

Always record Track 1 first. Track 1 is the master track for LOOPing, and is always the longest track in the loop.

TOUCH

If your synthesizer is equipped with AFTERTOUCH, MIDI/4 can record your use of it and duplicate it in playback. However, recording AFTERTOUCH consumes a significant amount of memory, so we made it selectable.

TOUCH is switched ON or OFF by moving the cursor to this area and pressing (RETURN).

EXITING THE FORMAT SCREEN

After you've made all the changes you wish to make, press the SPACE BAR. The command area changes to:

RECORDER IS OFF
DISK / EDIT / FORMAT
PRESS SPACE TO RECORD/PLAY

Now, you may press:

(D) To go to the Disk Functions screen, where you save and load sequencer files. (See pg.33)

(F) To go back to Format. (The screen we just came from.)

(E) To EDIT tracks. (See pg.26)

Or you can start recording with your new sequencer. Turn to the next page.

RECORDING YOUR FIRST TRACK

To record a non-looped track:

1) On the Format screen, use the cursor keys to select TRACK 1, and press (R) to set the MODE to RECORD.
2) Move the cursor down to TEMPO and enter the TEMPO number you wish to record at.
3) Move the cursor to CLICK and enter the number of beats in one measure. (For $^{4}4$ Rock enter (4), for $^{3}4$ Waltz enter (3), etc.)
4) Select DRUMS if you wish to work with a drum machine. (We advise waiting until you've become familiar with ordinary recording, first.)
5) Select TOUCH if your machine is so-equipped and you wish to record it.
6) Press the (SPACE BAR). The following prompt will appear in the Command area:

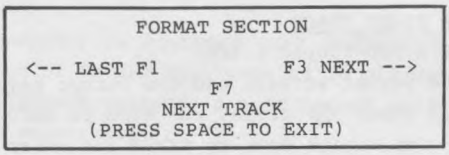
[PRESS SPACE TO RECORD/PLAY]

TO START: All you do is press the (SPACE BAR)! If you have set CLICK to any number except 0, the metronome will count off that number of beats before recording starts.

When the message [RECORDER IS ON] flashes on the screen, you may start playing. The sequencer is in gear and recording everything you do, including preset changes, pitch bends, key velocity, aftertouch (if selected), and all other controllers.

How long can you play? It's hard to give an absolute answer to that question; track length depends on how fast and how polyphonic you play, how you use pitch bend and other manual controls, whether the keyboard is velocity-sensitive... The sequencer has a total capacity of about 40 kilobytes, which we conservatively estimate allows you to record 6,000 notes, divided between the tracks as you see fit. (You may be able to record more.)

TO STOP: When you've recorded all you wish to record, press the (SPACE BAR) to stop! You'll return to the Format screen:



PLAYBACK

1) Move the cursor to Track 1 MODE and press (P) to switch the track to PLAYBACK.
2) Press the (SPACE BAR) to exit the Format Screen and return to the Sequencer.
3) Press the (SPACE BAR) to start the sequencer playing back.

Simple and beautiful, isn't it? Another nice feature is that you can play your synthesizer "live" over the sequence, and you can use any of the synthesizer's controls to change the sound.

While the sequencer is "playing back", you have three commands that affect playback:

(+) ("Plus" key) Speed up sequencer playback tempo.

(-) ("Minus" key) Slow down sequencer playback tempo.

(SPACE) Stop playback and return to Format Sceen. Press the space bar twice to re-start from the beginning.

Experiment with these controls, until you become comfortable with them. When you're confident about what they do, and you've listened to your first sequence enough, press (SPACE BAR) to return to the Format Screen.

OVERDUBBING A SECOND TRACK

After recording the first sequence on Track 1, press (F7) to move the cursor to Track 2, then press (R) to switch it to RECORD MODE. A convenient feature of MIDI/4 is if one track is in RECORD putting another track in RECORD automatically switches the first track to play. You cannot have two tracks in RECORD at the same time.

Unlike a tape recorder there is no difference between normal playback and sync playback; the four tracks of the sequencer are always synchronized. Remember though, when you have more than one track running one synthesizer, the highest-number track's PRESET NUMBER is in control.

Also remember, CHANNEL refers to the MIDI INPUT/OUTPUT CHANNEL, and has nothing to do with sequencer tracks. If you're running several tracks through one synthesizer, be sure all tracks going to the same synthesizer are set to the same CHANNEL.

You may also change TEMPO, CLICK, or TOUCH between recording tracks, but not LOOP.

After switching Track 2 MODE to RECORD, and making any other legal changes in Format, press (SPACE BAR) to return to the prompt:

PRESS SPACE TO RECORD/PLAY

Then press the (SPACE BAR) to begin recording the next track.

As before, if you've selected CLICK the metronome will count off a few beats before recording begins, and then you'll hear your first track being played back. You may begin playing your second track at any time after the first track has begun, and the second track may be longer or shorter than the first track. Press the (SPACE BAR) when you've finished, move the cursor to Track 2 MODE

(if necessary), and press Ⓟ to set the MODE to PLAYBACK. and set Track 2 to PLAYBACK mode.

PLAYBACK OF OVERDUBBED MATERIAL

Playback of overdubbed tracks is identical to playback of a single track. With all tracks set to PLAYBACK (or OFF) MODE press (SPACE BAR) once to exit the Format screen, and press (SPACE BAR) again to start PLAYBACK.

OVERDUBBING THIRD AND FOURTH TRACKS

The process of adding third and fourth tracks is identical to overdubbing the second track. There is one thing to be aware of, though. Some MIDI-instruments have as few as five voices; if all tracks are running to the same synthesizer, you stand a very good chance of running out of voices before you run out of tracks!

If this happens, you´ll notice parts dropping out of the earliest-recorded tracks while you´re overdubbing, as the keyboard always has priority over the sequencer. This does not harm the recorded tracks. The data is still there; there´s just no voice available to play it. Short of buying another MIDI keyboard, there´s no cure for this condition.

RECORDING A LOOPED TRACK

A LOOPED Track is a track that is tied back to its beginning. In PLAYBACK MODE a LOOPED Track will play through to the end and then, without pausing, return to its beginning and start playing back all over again. LOOPED Tracks will continue repeating themselves until manually shut off by pressing (SPACE BAR).

To record a LOOPED Track:

1) If you have been experimenting with the sequencer, you will need to turn off the old tracks. Move the cursor onto every track's MODE and press (O) ("o", not "zero"!) to turn the tracks OFF.
2) Move the cursor to Track 1's MODE and press (R) to place Track 1 in RECORD MODE.
3) Move the cursor onto LOOP and press (RETURN) to switch LOOP to ON.
4) Set TEMPO and CLICK as desired.
5) Press (SPACE BAR) to exit the Format screen. The prompt in the Command area is:

[PRESS SPACE TO RECORD/PLAY]

6) Start the sequencer by pressing the (SPACE BAR). As before, if you selected CLICK you'll hear a few beats before the sequencer starts RECORDING.

There are two ways loop recording differs from ordinary recording. First, the sequencer loops back to the first note recorded. This means if you begin a looped track with leading rests, the rests are ignored when the track loops. So you will usually want to record the first note of the track on the downbeat of the first measure in the loop.

The other difference comes when you stop recording. The last note played is never heard; it's a "non-part" note defining the end of the track.

But that last note played also marks where the "splice" takes place! To get a rhythmically accurate loop, you must play the "non-part" note on the downbeat of the next measure.

In other words, if you want your loop to sound like this:

Play this:

(Your loops may be longer, of course.) A looped track, once recorded, may be played back with LOOP ON or OFF.

NOTE: All notated music examples used in this manual were developed and printed using PolyWriter Transcription and Score Printing software.

OVERDUBBING ON LOOPS

To record a second track in LOOP mode:

1) Move the cursor to Track 2's MODE and press Ⓡ to switch Track 2 MODE to RECORD. This will automatically switch Track 1 to PLAYBACK MODE.
2) You may change TEMPO, CLICK, PRESET, or TOUCH between recording the first and second tracks, but not LOOP. When you have made whatever changes you wish in Format, press (SPACE BAR) to exit the Format screen.

The prompt reads:

PRESS SPACE TO RECORD/PLAY

Press the (SPACE BAR) to begin recording the next track.

As before, if you've selected CLICK the metronome will count off a few beats before recording begins, and then you'll hear your first track being played back. You may begin playing your second track at any time. There are a couple of very important howevers, though:

- Additional tracks cannot be longer than the first track in a loop. The first track is the master track, and loop timing is based on it.

- Additional tracks must not begin before the first track.

- You cannot be holding down any keys on the keyboard when the first track ends. In LOOP recording, the sequencer ignores anything you do after the end of the first track, including taking your fingers off the keys! If you are holding keys down when the first track ends then as far as the sequencer is concerned you're still holding them down, and they will sustain indefinitely.

3) After you have played through to the end of the track, press (SPACE BAR) to return to the Format screen, and set the track you've just recorded to PLAYBACK MODE.

ADVANCED RECORDING TECHNIQUES

Once you're comfortable with the basic procedure of laying down and overdubbing sequence tracks, you may begin to investigate some of the more sophisticated features of MIDI/4.

From the DISK / EDIT / FORMAT menu, select (E) (for EDIT).

The command area will change to read:

```
EDIT SECTION

ERASE A TRACK
MIX TWO TRACKS
PUNCH IN

ENTER COMMAND, OR  SPACE  TO EXIT
```

ERASE

Normally a track is erased when you record over it. There are times, though, when you'll want to clear a track out without recording any new material.

To ERASE an unwanted track, press (E). You'll be prompted to either enter the number of the track to be ERASED or press the (SPACE BAR) to change your mind.

MIX

One of the most exciting features of MIDI/4 is the MIX TRACKS option. Two recorded tracks can be merged into one track, mixing all the data of the two original tracks, and freeing up another track to record on. Then, after the new track is recorded, it too can be mixed with the original tracks, and more new tracks added!

Mixed tracks can be combined with other mixed tracks; the net result is like having dozens of sequencer tracks! The limiting factors are the number of voices the synthesizers in your MIDI system will support, and the total memory of the track.

To use the MIX function:

After recording two tracks and setting them both to PLAY mode press the (SPACE BAR) to exit the Format screen and (E) to get to the ERASE / MIX / PUNCH IN prompt. Then press (M).

You're asked for the SOURCE and TARGET tracks. SOURCE is the track that will "move in" with the TARGET track. After you have entered the track numbers, you're asked if you're sure you want to mix your tracks. MAKE SURE YOU HAVE A DATA DISK IN YOUR DISK DRIVE! To allow maximum sequencer capacity, the tracks are MIXed from the sequencer to the disk, and then reloaded from the disk when MIX is finished.

Assuming you have a data disk in the disk drive and want to go ahead with the mix, press (Y). When MIX finishes you'll return to the Format screen, to find the TARGET track in PLAYBACK and the SOURCE track OFF.

MIX combines all the music and controller change data on the SOURCE track with the data on the TARGET track, and the "merged" tracks reside on the TARGET track. The SOURCE track becomes vacant.

If you start sequencer playback now (by pressing the (SPACE BAR) twice) you'll find the TARGET track contains all the data from both tracks. The pitch bends and preset changes have also been combined.

Two last considerations about mix:

- If you are using different Input/Output CHANNELs for your two tracks, remember that when you mix them, they'll both wind up on the Input/Output CHANNEL of the TARGET track. One track cannot go to two different CHANNELs, but two (or more) synthesizers can be on the same CHANNEL, and on the same track.

- Once mixed, tracks cannot be "unmixed". We suggest saving the separate tracks (onto a "scrapbook" data disk) before mixing, in case you want to "undo" the mix later.

CONTROL TRACKS

More than just keyboard information is recorded when you are laying down sequencer tracks -- the sequencer is also storing pitch bends, preset changes, and all controller changes.

This opens up the possibility of "control" tracks. You can lay down tracks in which you don't play anything on the keyboard at all, but just make controller changes. Then, by mixing the control track with a keyboard track, you get a finished sequence that sounds as if you'd played a spectacularly difficult keyboard part and made dozens of controller changes all at the same time.

PUNCH IN

During playback you may jump directly from playback to record while the sequencer is running, to insert new material.

From the ERASE / MIX / PUNCH IN prompt, select (P). You'll be asked for the NUMBER of the TRACK you wish to punch into. Enter the NUMBER (1, 2, 3, or 4). If you change your mind, press (F7) to clear your entry.

After entering the TRACK NUMBER, press (SPACE) to return to the Format screen. Note that an ★ appears alongside the number of the TRACK you've chosen to PUNCH IN to. This is your indicator that PUNCH IN is active. Leave the track in PLAY-BACK MODE.

Now, press (SPACE BAR) to start the sequencer. When the track cycles through to the point at which you wish to begin inserting new material, press (RETURN) to switch into RECORD MODE and start playing; any material previously on the track is erased from the punch-in point to the end of the track.

- After PUNCHING INto a track you must play it through to the end. You cannot "punch out".

- Be careful to always punch into a silent spot! If you punch into the middle on a note already recorded on the track, the key-off data is erased; as far as the sequencer knows you're still holding the key down and it will sustain indefinitely.

TEMPO

TEMPO is a changeable, saveable, parameter. You can record awesome, tight, precise, sequences by setting TEMPO to a slow and comfortable pace when keying the parts in, and then resetting it to Molto Prestissimo before playback. Current TEMPO is saved when you save the sequence.

MULTIPLE KEYBOARDS

If you are running a multiple keyboard system, there are some things you need to keep in mind.

First and foremost, the synthesizer connected directly to your computer (see pg.6) is the recording keyboard. All the other keyboards in the system are playback-only.

Secondly, CHANNEL number is irrelevant during recording. All keyboard parts are initially recorded from the synthesizer connected directly to the computer. At the time of recording, it doesn't matter which instrument you wish to hear the music played back through or what CHANNEL the playback instrument is on. When the track is switched to PLAYBACK MODE, the instrument whose Input CHANNEL matches the track's Output CHANNEL will be the instrument that plays back the track(s).

Even if the recording instrument and the playback instrument are on different CHANNELS, it is not necessary to change CHANNEL between recording and playback.

Third, it is a good practice to record the tracks that are to play back through your playback-only instruments before recording the track to play back through the recording keyboard. The track that will be played back through the recording instrument should be the last track recorded. This helps minimize confusion and voice drop-out during overdub.

WORKING WITH DRUM MACHINES

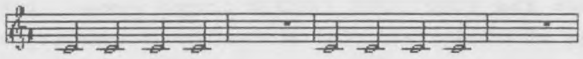
Assuming your drum machine is capable of accepting external CLOCK and START/STOP signals (see pg.7), your MIDI/4 Sequencer system is easily synchronized with your drum machine. The drum machine will start when the sequencer starts, and stop when the sequencer stops.

We've always found it's easier to program the drum machine first, and then enter your sequences while playing along with the drum machine, rather than trying to sync up the drum machine with sequences after they're recorded. However, unless your drum box is MIDI-equipped, don't change TEMPO while overdubbing or playing back keyboard parts. The sequencer and the drum machine will go out of sync.

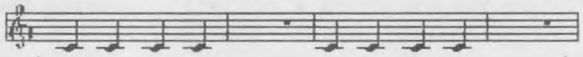
When using the drum machine with LOOPED tracks, MIDI/4 sends a "RESET" signal to the drum machine at the end of the loop, to ensure that the machines stay synchronized.

While the MIDI standard is 24 clock pulses per quarter note, different non-MIDI drum machines use different clock speeds: Emu's Drumulator and Roland drum machines use 24 clocks/quarter note, Korg and Linn use 48, and Oberheim uses 96. This means the Roland and Drumulator will run at normal speed, the Korg or Linn at half speed, and the Oberheim at one-quarter speed with respect to the MIDI system. You must take these differences in tempo into account when programming your drum machine.

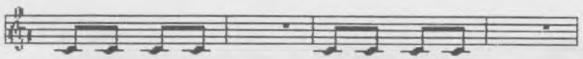
As an example, the following beat pattern would be programmed into a Roland, Drumulator, or MIDI drum machine "as is":



Programmed into a Linn as:



Or programmed into an Oberheim as:



Drum Machine CLOCK Change

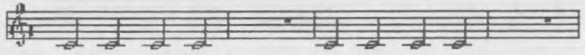
To allow easier programming of Linn, Korg, and Oberheim drum machines, the Drum Sync CLOCK Rate may be changed from 24 pulses per beat (MIDI Standard Time) to 48 pulses per beat. This affects only the Drum Sync, and does not affect Sequencer TEMPO.

To find out whether your sequencer is set for 24 or 48 pulse CLOCK Rate, look at the DRUM parameter on the Format screen. When the sequencer is set for a 24 pulse/beat CLOCK Rate, pressing (RETURN) switches DRUM between OFF and 24. When the sequencer is set for a 48 pulse/beat CLOCK Rate, pressing (RETURN) switches DRUM between OFF and 48.

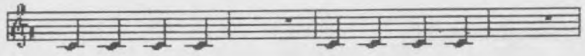
To change Drum Sync CLOCK Rate:

1) From the DISK / FORMAT / EDIT prompt, enter CTRL C. (Hold down the CONTROL key and press C for CONFIGURE.)
2) When the CONFIGURE PROGRAM prompt appears, press D. This switches the CLOCK rate; if your system was set for 24 pulse/beat, it is now set for 48. If it was set for 48, it is now set for 24.
3) Press SPACE BAR to return to the DISK / FORMAT / EDIT prompt.

Once the Drum Sync CLOCK rate has been reset to 48, Korg and Linn drum machines will operate normally. Oberheim drum machines will operate at half speed. As an example, the following beat pattern would be programmed "as is" into a Linn:



Or programmed into an Oberheim as:



DISK STORAGE

Once you become comfortable with the sequencer, you'll start laying down tracks you want to save. Even if what you're playing isn't perfect, the synthesizer/sequencer combination makes a very handy system for trying out arrangements and new ideas, and saving your experiments. It's faster to use and easier to rearrange with than a tape recorder; it's like a sketch pad for music.

To save sequencer files you must have formatted data disks (see pg.5). The MIDI/4 Program Disk is copy-protected, so you cannot (nor should you want to) use the program disk for storing sequencer files.

To save a sequencer file:

From the Format screen, press (SPACE BAR) to go to the DISK/FORMAT/EDIT prompt line, and press (D) to go to the DISK sub-menu. The following prompts appear in the Command area:

```
DISK SECTION
CATALOG / LOAD / SAVE / DELETE
ENTER COMMAND, OR  SPACE  TO EXIT: ?
```

Press a letter key to select the disk function you desire, or the (SPACE BAR) to return to the DISK/FORMAT/MIX prompt. You must have a disk in the drive before selecting any of these functions. The four functions are:

(C) -- Display the CATALOG (contents) of the disk.

(L) -- LOAD a sequencer file. The (L) prompt begins to flash, and you're asked for the name of the file to be LOADed. Type it in and press (return).

Ⓢ -- SAVE a sequencer file. The Ⓢ prompt begins to flash, and you're asked for the name of the file to be SAVED. Think up a name, type it in, make sure your data storage disk is in the drive and NOT the program disk, and press RETURN.

If there's a file with the same name already on the data disk, you'll be prompted: FILE ALREADY EXISTS; REPLACE? Enter Ⓨ to write over the existing file. If you don't want to replace it, enter any other key. However, an unavoidable quirk of the Commodore disk drive is that if you chose not to replace the file, the DISK ERROR light begins blinking. Ignore it; it's harmless.

If you CATALOG the disk after saving a track, you'll see that sequencer tracks are saved with the filenames you give them and the file type " • M4" (e.g. ROCKTUNE•M4). The file type is automatically added by the program. Remember, type in only the filename (and press RETURN) when LOADING, SAVING, or DELETING files.

Ⓓ -- DELETE a sequencer file. If you make a practice of saving every experimental track you lay down, and every set of tracks before a mix, you'll eventually find your data disks are full of alternate takes and other unwanted material. When you're certain you won't need a file anymore, you may DELETE it by selecting Ⓓ from the disk submenu. The Ⓓ prompt begins to flash, and you are asked for the name of the file to be DELETED.

Type in the file's name and press RETURN.

SPACE -- Exit Disk Sub-Menu and go to DISK/FORMAT/EDIT prompt.

NOTE: MIDI/4 track files are not compatible with sequencer files created by Passport Designs' MIDI Two-Track program, or Passport Designs' Soundchaser FourTrak program.

APPENDIX: MIDI CODES

The following MIDI protocol codes are transmitted (sent) and recognized (received) by Passport's Sequencer software.

The codes are grouped into single- or multi-byte messages. The multi-byte messages consist of a STATUS byte, followed by one or more DATA bytes. All STATUS bytes are eight bit numbers with the Most Significant Bit set (=1). DATA bytes have their MSB reset (=0), with legal values ranging from 0 to 127.

Message	STATUS BYTE	Number of DATA bytes	Description
KEY OFF	$80	2	Key number (0 - 127) Velocity (0 - 127)
KEY ON	$90	2	Key number (0 - 127) Velocity (0 - 127)
KEY AFTERTOUCH	$A0	2	Key number (0 - 127) Pressure (0 - 127)
CONTROLLER CHANGE	$B0	2	Contr. ID (0 - 121) (122 - 127 reserved) Amount (0 - 127)
PROGRAM CHANGE (PRESET)	$C0	1	Program identifier (0 - 127)
CHANNEL PRESSURE	$D0	1	Amount (0 - 127)
PITCH WHEEL	$E0	2	Pitch wheel change LSBYTE (0 - 127) MSBYTE (0 - 127)
MIDI SYTEM TIMING CLOCK	$F8	0	System synchronizes w/this clock, sent @ 24 clocks/qtr note.
START	$FA	0	Sent when SPACE key is pressed.
CONTINUE	$FB	0	Sent after PAUSE and RESTART.
STOP	$FC	0	Sent @ sequence end.
MIDI ACTIVE SENSING	$FE	0	Sent @ 24 clocks per quarter note.

MIDI/4 QUICK REFERENCE GUIDE

Command		Page
	FORMAT SCREEN	
	• Cursor Commands •	
F7	Select track to work on.	13
F3	Move right; select Parameter to change.	13
F1	Move left; select Parameter to change.	13
	• Format Parameters •	
	Position cursor in area and enter new value.	
TR	Track number. Shown for reference.	14
MODE	O = Off. P = Playback. R = Record.	14
CH	MIDI Input/Output Channel. (1 to 16)	14
PRE	Starting Preset for Sequencer Playback. (1 to 128)	15
INSTR	Identify synthesizer used. (12 letters, RETURN)	16
TEMPO	Record/Playback tempo. (32 to 159)	16
TRANS	Transposition. (+ or -) (1 to 12) half steps.	16
CLICK	O = Off. (1 to 9) = "Count off" before recording.	17
DRUMS	Drum machine sync. Return to toggle OFF/ON (24 or 48)	17
LOOP	Return to toggle ON/OFF.	17
TOUCH	Return to toggle ON/OFF.	18
	• Exit from Format •	
SPACE	Exit to Sequencer and Disk/Edit/Format Menu.	18
	SEQUENCER SCREEN	
	• Record Mode •	
SPACE	Toggle sequencer start/stop.	18
	• Playback Mode •	
SPACE	Toggle sequencer start/stop.	20
+	Speed up playback tempo.	20
-	Slow down playback tempo.	20
	DISK SCREEN	
C	Catalog disk.	33
L	Load file.	33
S	Save file.	34
D	Delete file.	34
	EDIT SCREEN	
E n	Erase Track number n.	26
M x y	Merge Track x into Track y.	26
P n	Prepare for punch-in record on Track n. Return to Playback mode, press RETURN to punch in.	27

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